



NOAA SCIENTIFIC PUBLICATIONS REPORT

OCTOBER 8, 2012 - OCTOBER 19, 2012

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1. HIGHLIGHTED ARTICLES

1a. Title: *Geospatial analysis of habitat use in yellowtail flounder *Limanda ferruginea* on Georges Bank*

Journal: Marine Ecology Progress Series

Authors: Pereira JJ (NMFS/NEFSC), ET Schultz, PJ Auster

Significance:

- Local densities of yellowtail flounder within preferred habitat on Georges Bank increased over time (1999-2004) even as population abundance varied.
- The area of preferred habitat is almost entirely within areas closed during that time to most gear that would capture groundfish, indicating that the current US closed area is providing important protection for yellowtail in Georges Bank, a stock that has been at low population numbers for nearly 40 years.
- The area was defined using data commonly collected in long-standing standardized surveys, indicating that the methods may also be appropriate for use with other species to evaluate current or proposed closed areas intended to promote fishery stock productivity.

Level of controversy: Moderate to high, potentially as catch limits for this species in 2013 are highly controversial.

Summary: Three theories of habitat use proposed for marine fishes-- the Constant Density Model, the Proportional Density Model, and the Basin Model-- make contrasting predictions of how the geographical range, local density, and fitness change as population size changes. We tested model predictions with survey data on yellowtail flounder



from the Georges Bank region, where abundance changed by a factor of 4 over a decade. Surveys took place in spring and fall, and

Credit: Jeff Rotman—Stone/Getty Images



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data on individual length, mass, sex and reproductive status were available. Analysis of spatial pattern revealed that the overall area occupied by flounder increased by a factor of 2 when abundance was high, and local density increased predominantly in high-quality habitat that had been closed to commercial fishing. Condition, which served as a proxy for fitness, was lower in females when abundance was high. Geospatial analysis revealed mesoscale variability in condition, over tens to more than a hundred km, except in the spring season during low abundance periods. Spatial autocorrelation explained as much as 25% of the variability in condition, indicating that site dependence was a factor in explaining the spatial distribution that we observed. These results are most supportive of both the Constant Density Model and the Basin Model. This approach detected an important population center for yellowtail flounder and determined its extent using only measures of abundance, location, and condition of individual fish, data commonly collected during routine fishery assessment surveys. Here we demonstrate that analyses linking population responses to variation in such measures at local spatial scales can have significant implications for identifying areas of important fish habitat and suggest greater use of geospatial approaches in conservation and management of exploited species.

Publication Date: Unknown

Press release/Roll out plan: None

1b. Title: *Phylogenetics links monster larva to deep-sea shrimp*

Journal: Ecology and Evolution

Authors: Heather D. Bracken-Grissom (BYU, FIU), Darryl L. Felder (University of Louisiana at Lafayette), **Nicole L. Vollme (NMFS SFSC)**, Joel W. Martin (Natural History Museum of Los Angeles County), Keith A. Crandall (BYU)

Significance:

- This paper demonstrates that exploration of our largely unknown oceans continues to yield fascinating biodiversity discoveries.
- Modern genetic techniques allow scientists to link larval forms to adult counterparts that often differ strikingly in morphology and habitat.



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- This paper proves that *Cerataspis montrosa* and *Plesiopenaeus armatus* are different life phases of the same species.

Level of controversy: Low

Summary: Mid-water plankton collections commonly include bizarre and mysterious developmental stages that differ conspicuously from their adult counterparts in morphology and habitat. Unaware of the existence of planktonic larval stages, early zoologists often misidentified these unique morphologies as independent adult lineages. Many such mistakes have since been corrected by collecting larvae, raising them in the lab, and identifying the adult forms. However, challenges arise when the larva is remarkably rare in nature and relatively inaccessible due to its changing habitats over the course of ontogeny. The midwater marine species *Cerataspis monstrosa* is an armored crustacean larva whose adult identity has remained a mystery for over 180 years. Our phylogenetic analyses, based in part on recent collections from the Gulf of Mexico, provide definitive evidence that the rare, yet widely occurring larva, *C. monstrosa*, is an early developmental stage of the globally distributed deepwater aristeid shrimp, *Plesiopenaeus armatus*. Divergence estimates across 5 genes confirm the larva and adult are the same species. Our work demonstrates the diagnostic power of molecular systematics in instances where larval rearing seldom succeeds and morphology and habitat are not indicative of identity. Larval-adult linkages not only aid in our understanding of biodiversity, they provide insights into the life history, distribution, and ecology of an organism.



Photo: Bracken-Grissom et al.

Publication Date: August 27, 2012 (online)

Press release/Roll out plan: Social media and media releases are both planned

- 1c. Title:** *Climate-induced primary productivity change and fishing impacts on the Central North Pacific ecosystem and Hawaii-based pelagic longline fishery*
Journal: Climatic Change



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Authors: **Evan A. Howell (NMFS/PIFSC)**, Colette C. C. Wabnitz (Secretariat of the Pacific Community), **John P. Dunne (OAR/GFDL)**, **Jeffrey J. Polovina (NMFS/PIFSC)**

Significance:

- Using an ecosystem-based approach, the authors show that climate change will reduce fisheries yield of the Hawaii-based pelagic longline fishery by the year 2100, through reduced primary productivity (phytoplankton biomass).
- Decreasing fishing mortality in the face of climate change may mitigate these climate impacts and sustain fishery yields.
- This paper is a great example of collaboration between two Line Offices of NOAA (NMFS and OAR), and is part of broader NOAA efforts to model ecosystems and determine the impacts of climate change on fisheries and biological resources.

Level of controversy: Low

Summary: Climate-driven changes in fish stock productivity and potential fishery yield will have socio-economic impacts on the fishing community and may require adjustments of harvest policies by fishery managers. Using an ecosystem and climate model, the authors found that climate change in the central North Pacific will decrease phytoplankton biomass by 10-20% by the year 2100, resulting in 10% less biomass of higher trophic levels and a 25-29% reduction in the Hawaii longline fishery yield. Such impacts may be partially mitigated by decreasing fishing effort and fishing mortality. The authors came to these conclusions using an existing ecosystem model modified for the central North Pacific (Ecopath with Ecosim) to focus on the area used by the Hawaii-based pelagic longline fishery, combined with output from a coupled NOAA Geophysical Fluid Dynamics Laboratory climate and biogeochemical model. Four simulations were conducted based on 2 fishing effort and climate scenarios through the year 2100. Managers and fishery constituents should plan for change and evaluate strategies to maintain sustainable fisheries in the face of declining stock productivity.

Publication Date: October 9, 2012 ([online](#))

Press release/Roll out plan: PIFSC Twitter



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1d. **Title:** *Cusk (Brosme brosme) and climate change: assessing the threat to a candidate marine fish species under the Endangered Species Act*

Journal: ICES J Marine Science

Authors: Hare JA (NMFS/NEFSC), J Manderson (NMFS/NEFSC), J Nye, M Alexander, PJ Auster, D Borggaard (NMFS/NERO), A Capotondi (ESRL), K Damon-Randall (NMFS/NERO), E Heupel, I Mateo (NMFS/NERO), L O'Brien (NMFS/NEFSC), D Richardson (NMFS/NEFSC), C Stock, ST Biegel (NMFS/NERO)

Significance:

- While the study does not find cusk (a cod-like fish) are likely to become locally extinct in the NW Atlantic at this time, cusk habitat could fragment as a result of a spatial mismatch between high complexity seafloor habitat and suitable temperature.
- Results will be used to inform an ESA listing decision for cusk, currently a species of concern.

Level of controversy: Moderate, due to ESA listing issues and cusk is bycatch in the Northeast groundfish fishery.

Summary: In the Northwest Atlantic Ocean cusk populations have declined dramatically, primarily as a result of fishing activities, prompting reviews under the U.S. Endangered Species Act and the Canadian Species at Risk Act. Climate change and climate variability are known to impact the distribution and abundance of marine fish, therefore this paper investigates the potential effects of climate change on cusk populations. The results suggest that cusk could be at risk due to spatial mismatches between high complexity seafloor habitat and suitable temperature. The importance of habitat patch connectivity for cusk is poorly understood, so the population-level consequences of climate-related habitat fragmentation are uncertain. More broadly, climate effects on the distribution of thermal habitat could produce habitat fragmentation for other cold water species in the region; thereby, increasing the potential for regional overexploitation and extirpation.

Publication Date: [Available on line now](#), print date December 2012

Press release/Roll out plan: None



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2. ADDITIONAL ARTICLES

2a. Title: *A Maturity Model for Assessing the Completeness of Climate Data Records*

Journal: EOS Transactions American Geophysical Union

Authors: John J. Bates and Jeffrey L. Privette, NESDIS NCDC

Significance:

- The model focuses on process improvement to ensure traceability, transparency, and scientific rigor of Climate Data Records (CDRs).
- Adoption of this standard by the climate community would help ensure quality long-term climate data records and facilitate use in decision-making across natural and social science disciplines.

Summary: This maturity matrix model may serve in the future as a requirement for use of data sets in international assessments or in other societal and public policy applications similar to certification programs that engineering professions conduct. The model focuses on process improvement to ensure traceability and transparency of climate data records but includes steps related to standard scientific review and assessment.

Publication Date: October or November 2012

3. OTHER REPORTS, BOOK CHAPTERS, AND INTERNAL PUBLICATIONS

3a. Book Title: *A Profile of the Hook and Line Fishery for California Halibut in Monterey Bay, California: Learning from Fishermen through Collaborative Research*

Authors: Oren T. Frey (NOS/NMS), Geoff Shester (Oceana), and Andrew P. DeVogelaere (NOS/NMS)

Significance:

- The hook and line fishery for California halibut in Monterey Bay is an economically viable commercial fishery that may have substantially less bycatch than bottom trawling for this species.



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- Collaborative research involving fishermen as participants and data gatherers provides significant opportunities to collect important, management-relevant data.

Summary: The objective of this pilot study is to provide a preliminary snapshot characterization of the California halibut fishery currently taking place in northern Monterey Bay, California with hook and line gear, focusing on costs and revenues to participating fishermen, spatial patterns in fishing effort, and incidental catch. The intent is to contribute additional information to ongoing dialogue regarding the relative impacts of hook and line fishing gear and the potential to increase landings with this gear type in Monterey Bay.

Publication Date: November 30, 2012

- 3b. Report:** *The Natural Resources of Monterey Bay National Marine Sanctuary: A Focus on Federal Waters*

Authors: Jennifer A. Brown, Erica Burton, and Sophie DE Beukelaer (NOS/NMS)

Summary: This document is a natural resources assessment that synthesizes the current scientific knowledge of the physical and biological resources in the offshore habitats of the Monterey Bay National Marine Sanctuary. The report is organized by offshore habitat category and spans many levels of ecological organization and process.

Publication Date: November 30, 2012